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Nantucket Pine Tip Moth

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The Nantucket pine tip moth, *Rhyacionia frustrana* (Comst.), is considered one of the more important forest insect pests in the Eastern United States. Its range extends from Massachusetts to Florida and west into Texas (fig. 1). The species also occurs in Canada, having been reported over a wide area in Ontario.

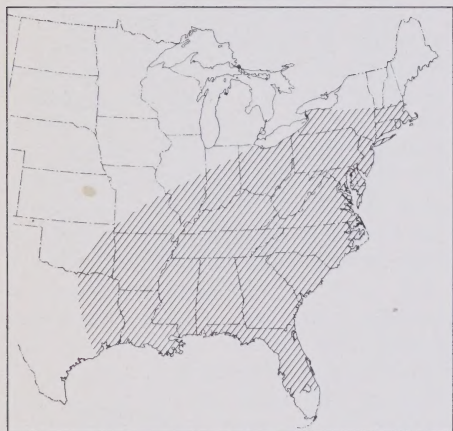


FIGURE 1.—Distribution of the Nantucket pine tip moth within the United States.

Attack by the Nantucket pine tip moth is most damaging to plantations of susceptible species of pine and to wild seedlings in open areas. This insect poses an ever increasing problem because of existing trends in forestry that favor the establishment of large areas of pine plantations. In such areas, Nantucket pine tip moth damage may be very severe.

Hosts

Nearly all species of native and exotic pine that grow in the eastern half of the United States are at-

tacked by the Nantucket pine tip moth. The only exceptions are longleaf pine and eastern white pine. Slash pine, although occasionally attacked, is quite resistant.

Certain pine species are preferred in different parts of the United States. In the South and Southeast the favored hosts are loblolly and shortleaf pine. Pitch, Virginia, and Scotch pines appear to be favored in New England and the Middle Atlantic States and shortleaf pine is favored in the Central States.

Evidence of Infestation

Evidence of early feeding is indicated by small, delicate webs constructed by the young larvae. These webs are found in the axil formed by the developing needles and the stem. Later, webbing at the shoot tips and accumulation of resin and fecal material within this webbing is a more prominent indication of infestation. In a short time the tips of infested shoots die and turn brown making them quite noticeable from a distance.

Injury

The Nantucket pine tip moth injures the growing shoots of young pines. The larva bores into and feeds on inner tissues of the buds and shoots. Such feeding severs the conductive tissue and causes death of the shoot (fig. 2).

In severe and prolonged infestations, trees may be killed as a result of larval activity, but normally the loss or retardation of height growth and deformation of the main stem

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FIGURE 2.—Loblolly pine severely injured by the Nantucket pine tip moth. Note that slash pine in background is completely free of tip moth injury.

are the most important economic injuries. In some areas, every shoot may be killed as it develops; consequently, at the end of the growing season, little or no height has been added to the trees. Where tree vigor is poor, deformations such as stem crooking and forking may also occur. In seed orchards and seed production areas, cone and seed production may be reduced through destruction of shoots containing embryonic flower buds.

Description

The slightly convex egg is approximately $\frac{1}{32}$ inch in diameter. When laid, the egg is an opaque white, but it turns yellow to medium orange as it matures. The very small young larva is cream colored with a black head; the mature larva is light brown to orange and approximately $\frac{3}{8}$ inch long (fig. 3, A). The pupa is light to dark brown and approximately $\frac{1}{4}$ inch long (fig. 3, B). Just prior to emergence of the adult, variations in wing coloration can be detected

through the pupal skin. On emergence, gray scales cover the head, body, and appendages except for the forewings which are covered with brick-red and copper-colored patches separated by irregular bands of gray scales (fig. 3, C).

Life History

Nantucket pine tip moths overwinter as pupae within damaged shoots of the host trees in the United States (fig. 3, B). Farther north, in Ontario, they overwinter in the ground. On warm days, as early as February in the Deep South, adult moths emerge, mate, and lay eggs on the current season's new succulent growth. Very often early emerging moths appear before new growth has started and eggs are laid on old needles and shoots. The egg incubation period may extend as long as 30 days if cool weather follows egg laying in the spring, but for generations later in the summer it lasts 5 to 10 days. Newly hatched larvae may be found feeding on the surface of new growth and causing shallow injuries, or boring into the needle fascicles. Later, the larvae migrate to the shoot tips, construct a protective web at the base of the buds, and begin boring into the bud or stem tissue. Feeding continues inside these tissues until larvae are fully grown, a period lasting 3 to 4 weeks. Pupation occurs within the cavities formed by the larvae.

This process, depending on geographic location and weather conditions, is repeated from one to five times during a single growing season. One generation occurs in Ontario. Two generations occur in the northern part of the United States. South of Pennsylvania and into the Midwest, three generations occur as far south as North Carolina and Tennessee. States farther south have four generations per season with the exception of parts of the Gulf Coast area where five generations may occur.



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FIGURE 3.—A, Injured shoot dissected to expose mature larvae. B, Injured shoot dissected to expose pupae. C, Adult Nantucket pine tip moths have a wingspan of about $\frac{1}{2}$ inch.

Natural Control

Over thirty known species of parasites attack the Nantucket pine tip moth. In addition, several predatory insects and birds also attack this pest. Low winter temperature in the northern part of the range can cause mortality of the overwintering pupae.

Direct Control

Because of high cost of application, large-scale control with insecticides is not usually recommended. Control may be justified, however, in high-value areas, such as seed orchards or forest tree nurseries, where power sprayers can be used. A 1 percent DDT water emulsion is effective when applied with such equipment. One-gallon and 100-gallon lots of 1 percent emulsion can be prepared from different concentrates as follows:

DDT emulsifiable concentrate (percent) :	<i>Amount of concentrate used with enough water to make—</i>	
	<i>1 gallon (table- spoonfuls)</i>	<i>100 gallons (gallons)</i>
5-----	¹ 48	20
25-----	10	4
50-----	5	2
75-----	3	1 $\frac{1}{3}$

¹ Equals 3 cupfuls.

To obtain control throughout the complete season, spraying may be necessary for each generation. Spraying should be done 5 to 10 days after peak emergence of the adults. In early spring, when cool weather follows peak adult emergence, spraying should be deferred for about 14 days.

Airplane spraying of plantations has produced erratic results and additional studies are needed before

this method of control can be recommended.

Caution

DDT is poisonous. Store it in a plainly labeled container away from all food products. In handling this chemical follow the directions and heed the precautions given on the container. In forest spraying, avoid overdosing, especially over and around streams, ponds, and lakes.

Indirect Control

Certain cultural practices may be employed to reduce the damage done by this insect. Highly susceptible species of pine should only be planted on sites to which they are well adapted. On poorer sites, species of pine resistant to Nantucket pine tip moth should be substituted if possible. Such practices as close spacing and planting under an overstory may help reduce moth populations and subsequent injury.

References

- PINE TIP MOTH AND ITS CONTROL IN OKLAHOMA. H. AFANASIEV and F. A. FENTON. Jour. Forestry 45: 127-128. 1947.
- THE LIFE HISTORY AND CONTROL OF THE PINE TIP MOTH, RHYACIONIA FRUSTRANA (COMSTOCK), (FAMILY: TORTRICIDAE) AT NASHVILLE, TENNESSEE. M. F. MORTIMER. Tenn. Acad. Sci. Jour. 16 (2): 190-206, illus. 1941.
- PRELIMINARY OBSERVATIONS ON THE PINE TIP MOTH (RHYACIONIA FRUSTRANA COMST.) ON SOUTHERN PINES. P. C. WAKELEY. Int. Cong. Ent. Proc. 2 (2): 865-868. 1928.

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